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Remarks

Claims 1-13 were pending in the application. Claims 1-13 were rejected. No claims were merely objected to and no claims were allowed. By the foregoing amendment, no claims are canceled, claims 1, 2, and 10 are amended, and claims 14-20 are added. No new matter is presented.

Claim Rejections-35 U.S.C. 112

The examiner rejected claims 9 and 12 under 35 U.S.C. 112(2) for asserted informalities.

Regarding claim 9, the examiner questioned "how can a plurality of streams exit one outlet?" Office action, paragraph 3. At least theoretically, due to surface tension of the liquid, it may be possible for an appropriately configured single outlet to discharge multiple streams (the streams individually held together and therefore separated from each other by their surface tension). Regarding claim 12, the examiner questioned the wording "there are no other coolant outlet in addition to the plurality of coolant outlets." This element is identified, in part, for claim differentiation purposes. Specifically, claim 10 specifies a plurality of coolant outlets having identified properties. Claim 10 does not preclude the existence of other outlets lacking those properties. However, claim 12 is intended to preclude the presence of outlets lacking those properties.

Regarding both claims 9 and 12, in view of the foregoing, if the examiner believes alternative language is appropriate to achieve the intended goals, he is asked to telephone the undersigned to discuss an appropriate further amendment.

Claim Rejections-35 U.S.C. 102

Claims 1-6 and 9-13 were rejected as being anticipated by Arai et al. (U.S. Patent No. 5,332,341). Applicant respectfully traverses the rejection.

Arai et al. discloses a pressure foot for a printed circuit board drilling apparatus. The examiner identified elements 25 as the outlets. FIGS. 1 and 2 of Arai et al. show these outlets as tangentially and upwardly (proximally of the drill bit; toward the spindle) directing an airflow containing atomized liquid. Regarding former claim 2, the examiner asserted that "the method of forming the device is not germane to the issue of patentability of the device itself..." Office

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action, paragraph 6. However, the identification of a "sintered ceramic" from former claim 2 and now added to claim 1 is a structural element. This is a non-obvious structural limitation. This structure facilitates ease of manufacture. For example, reference is made to Reitmeyer (U.S. Patent No. 6,471,573), also noted by the examiner. It can be seen that, just to introduce three closely-spaced streams, Reitmeyer involves a complex multi-piece structure requiring a large number of manufacturing steps. Amended claim 2 further identifies the body as being a single unitary piece. This, of course, does not preclude the presence of other components such as fittings, fasteners, and the like.

As amended, claim 10 identifies that the streams impact obliquely toward a tip of the bit (see also claim 16 further identifying the bit as an abrasive quill not suggested by Arai et al.). Any obliqueness of Arai et al. appears merely in the tangential direction and not tipward. Similarly, added claim 14 identifies that the outlet is angled to provide essentially total coverage along a length of an abrasive portion of the bit. Support for this is found in the penultimate sentence of paragraph 0017.

Added claim 15 identifies the cooling outlet as providing redundant coverage around the circumference of the quill so that, during a machining operation, the effects of a workpiece blocking one or more sprays of the coolant are limited. Support for this is found in the last sentence of paragraph 0017. This further distinguishes Reitmeyer which has a highly localized group of outlets intended only to deliver lubricant to an engagement region (see the first full paragraph of column 4).

Claims 10 and 20 further identify a circumferential spacing between adjacent outlets being no more than 72°. This further distinguishes both Reitmeyer and Arai et al. Support for this is found in paragraph 0020 (identifying at least five equally-spaced outlets, with 360° divided by five producing the 72° figure).

Claims Rejections-35 U.S.C. 103


Claims 2, 7, and 8 were rejected under 35 U.S.C 103(a) as being unpatentable over Arai et al. Applicant respectfully traverses the rejection. The examiner asserted that "choosing ceramic for its desired properties, e.g., durable, light... and/or using laser to form the nozzle, cost effective, would be well within the knowledge of one of ordinary skill in the art." Office action,

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paragraph 8. However, no support has been cited for this motivation. The specific motivation is insufficient. It has not been established that a sintered ceramic is any more durable than the Arai et al. material. Also, it has not been established that it is any lighter. Even if lighter, it has not been established that the weight difference is of any relevance in a world where the machine tools weigh in the hundreds if not many thousands of pounds. If anything, a sintered ceramic is less durable than other choices. As the examiner pointed out, laser sintering is known. This is principally used in prototyping parts (e.g., which may be subsequently formed of metal). Notwithstanding that a sintered ceramic may be less durable than metal, it has proven surprisingly adequate for actual use and not merely as a prototype. As for the number of outlets, the examiner cited a passage which related to a two-outlet embodiment of Arai et al. The mere fact that Arai et al. cites other combinations are possible does not constitute a suggestion for any specific number.

Accordingly, Applicant submits that claims 1-20 are in condition for allowance. Please charge any fees or deficiency or credit any overpayment to our Deposit Account 02-0184.

Respectfully submitted,

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